Simvastatin was cost-effective for reducing major vascular events in vascular disease or diabetes mellitus

Mihaylova B, Briggs A, Armitage J, et al. **Cost-effectiveness of simvastatin in people at different levels of vascular disease risk: economic analysis of a randomised trial in 20, 536 individuals.** Lancet. 2005;365:1779-85.

Clinical impact ratings: GIM/FP/GP ★★★★★★☆ Cardiology ★★★★★☆☆ Endocrinology ★★★★★★☆ Neurology ★★★★★★☆

QUESTION

In patients with vascular disease or diabetes mellitus, what is the cost-effectiveness of simvastatin compared with placebo for reducing major vascular events (MVEs)?

METHODS

Design: Cost-effectiveness analysis (CEA) (from the U.K. National Health Service perspective) of a randomized placebo-controlled trial (Heart Protection Study [HPS]).

Allocation: {Concealed}†.*

Blinding: Blinded {clinicians, patients, data collectors, and outcome assessors}†.*

Follow-up period: Mean 5 years.

Setting: {69 hospitals in the United Kingdom}†.

Patients: 20 536 patients (age range 40 to 80 y, 75% men) with nonfasting total cholesterol levels ≥ 3.5 mmol/L (135 mg/dL), coronary disease, cerebrovascular disease, other occlusive arterial disease, diabetes mellitus, or treated hypertension. Exclusion criteria included statin therapy, recent stroke, myocardial infarction (MI), angina hospitalization, abnormal liver function, impaired renal function, and severe heart failure (HF). Patients were rank-ordered by their 5-year predicted risk for MVEs into 5 quintiles.

Intervention: Simvastatin, 40 mg/d (n = 10 269), or placebo (n = 10 267).

Outcomes: MVEs (nonfatal MI or coronary death, nonfatal or fatal stroke, or arterial revascularization) and other vascular events (admission for angina, HF, or other vascular problems). Incremental costs of hospitalizations and simvastatin use were estimated in 2001 British pounds.

Patient follow-up: 100% (intention-to-treat analysis).

MAIN RESULTS

Fewer patients who received simvastatin had an MVE, other vascular event, or died of a vascular event than did those who received placebo (Table). Simvastatin reduced hospitalization costs more than placebo (£1800 vs £2301, relative cost reduction 22%, 95% CI 16 to 27). Cost per MVE or vascular death avoided varied according to risk group (Table). The estimated absolute reductions in vascular event costs per patient ranged from £847 to £264 (highest to lowest risk quintile, respectively).

CONCLUSIONS

In patients with vascular disease or diabetes, simvastatin was cost-effective for reducing major vascular events and reduced hospitalization costs. Cost-effectiveness varied according to underlying risk for vascular events.

Sources of funding: U.K. Medical Research Council; British Heart Foundation; Merck; Roche Vitamins.

For correspondence: Heart Protection Study, Radcliffe Infirmary, Oxford, England, UK. E-mail hps@ctsu.ox.ac.uk.

*See Glossary.

†Information provided by author.

Cost-effectiveness of simvastatin vs placebo for vascular disease or diabetes mellitus at 5 years‡

Outcomes	Simvastatin	Placebo	RRR (95% CI)	NNT (CI)
MVE	27%	36%	25% (22 to 28)	12 (10 to 14)
Other vascular event	42%	48%	11% (8 to 14)	19 (15 to 25)
Vascular death	7.6%	9.1%	17% (9 to 24)	66 (44 to 131)

Risk group (5-y MVE risk)	Incremental cost (£)	Cost (£) per MVE avoided (CI)	Cost (£) per vascular death avoided (CI)
1 (12%)	1164	31 100 (22 900 to 42 500)	296 300 (178 000 to 612 000)
2 (18%)	1062	18 300 (13 500 to 25 800)	147 800 (92 000 to 292 200)
3 (22%)	987	12 300 (8900 to 17 600)	78 900 (48 800) to 157 400)
4 (28%)	893	9600 (6700 to 13 900)	49 600 (30 800 to 100 700)
5 (42%)	630	4500 (2300 to 7400)	21 400 (10 700 to 46 100)
Overall	947	11 600 (8500 to 16 300)	66 600 (42 600 to 135 800)

‡MVE = major vascular event. Other abbreviations defined in Glossary; RRR, NNT, and CI calculated from data in article.

COMMENTARY

Although the study by the HPS investigators is an elegant CEA based on an extremely important clinical trial, it will be of little relevance to most clinicians and policymakers. Given the overwhelming evidence of the efficacy of statins for patients with an elevated risk for ischemic heart disease, it is unlikely that many clinicians would want to know if it is more cost-effective to use placebo or simvastatin, and unlikely that many formulary managers would ask whether statins should be available for these patients. The more relevant issue, which the article does not address, is the comparison of the incremental cost-effectiveness between the more costly and more powerful statins and those that are cheaper or less potent.

In addition to the unresponsiveness of this study to the needs of real decision makers (1), the results are difficult for the average non-U.K. reader to place into context. For example, costs associated with vascular events in the United Kingdom are probably quite different from those in the United States, given well-known differences in approaches to cardiovascular care (2). Furthermore, because most CEAs, including this study, take the societal perspective, interpretation of the results is problematic for clinicians who are ethically obligated to take the patient's perspective. Finally, the use of "costs per vascular event prevented" makes it difficult to compare this intervention with other health care interventions in which cost-effectiveness has been expressed with a more common outcome measure, such as the quality-adjusted life-year.

Nevertheless, this study's exploration of cost-effectiveness within specific risk groups is methodologically innovative and raises the interesting question of whether showing probable cost savings (a likely scenario as statin prices fall) should drive recommendations about level of risk at which treatment should be initiated.

Hanna E. Bloomfield, MD, MPH
Minneapolis VA Medical Center
Minneapolis, Minnesota, USA

References

1. **Luce BR.** Med Care. 2005;43:44-8.
2. **Drummond M, Sculpher M.** Med Care. 2005;43:5-14.